

REMARKS/ARGUMENTS

Applicant thanks Examiner for the detailed Office Action dated June 15, 2007. In response to the issues raised, the Applicant offers the following submissions and amendments.

Amendments

Independent claims 1, 18 and 35 have been amended to further characterize the structure of the invention. In particular, the CVD formed nozzle plate is spaced from the supporting surface of the wafer substrate by the CVD sidewalls. Likewise the heater elements are suspended beams formed in a plane parallel to both the nozzle plate and the supporting surface of the wafer substrate. This configuration was defined in (now cancelled) claims 7, 24 and 40.

Accordingly, the amendments do not add new matter.

35 U.S.C. §102 - Claims

Claims 1, 2, 4, 5, 6, 9, 13, 18, 19, 21, 22, 23, 26, 30, 35 to 39, 42 and 46 stand rejected for lack of novelty in light of US 6,482,574 to Ramaswami et al.

As discussed above, independent claims 1, 18 and 35 have been amended to restrict the scope of the invention to a printhead that has CVD side walls extending from one surface of the wafer substrate to support the nozzle plate. The heater elements corresponding to the nozzle apertures in the nozzle plate are suspended beams that are immersed in the bubble forming liquid during use. Suspending the heater elements in a plane parallel to the wafer substrate and the nozzle plate has the effect of greatly improving the energy efficiency for drop ejection. Little heat is lost to the substrate and the bubble formed is smaller (requiring less input energy) but configured so that the pressure pulse is broad and relatively flat. It moves through the chamber in a direction normal to the nozzle aperture and relatively aligned with the drop trajectory. This reduces the likelihood of drop misdirections and is fluidically efficient. The smaller bubble allows the nozzle plate to be thinner which is better suited to CVD fabrication and further reduces drag on the ejected droplets.

Ramaswami does not teach a heater element suspended as a beam for immersion in the bubble forming liquid. Accordingly, the cited reference does not teach fundamental elements of amended claims 1, 18 and 35. It therefore also fails to anticipate any of claims 1, 2, 4, 5, 6, 9, 13, 18, 19, 21, 22, 23, 26, 30, 35 to 39, 42 and 46.

35U.S.C§103 - Claims

Claims 7, 11, 14, 15, 17, 24, 28, 31, 32, 34, 40, 44, 47 and 48 stand rejected as obvious in light of Ramaswami in view of US 5,706,041 to Kubby.


As discussed above, Ramaswami fails to teach all the elements of amended claims 1, 18 and 35. Kubby also fails to disclose a heater element fabricated as a beam suspended in a plane parallel to the nozzle plate and the supporting surface of the wafer substrate. Kubby is clearly an 'edge-shooter' type of printhead IC (droplet trajectory is parallel to the plane of the wafer). Reconfiguring Kubby to be a 'side shooter' requires a fundamental restructure

of the printhead design. There is no suggestion in Kubby as to how a two dimensional array of heater elements might be patterned across the surface wafer and then released from its sacrificial scaffold layer and cover layer. Accordingly, the cited references do not teach or suggest all claim elements and so fail to support a §103 rejection.

Conclusion

It is respectfully submitted that the Examiner's rejections have been successfully traversed and the application is now in condition for allowance. Accordingly, favorable reconsideration is courteously solicited.

Very respectfully,

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